Thermophysical Properties of HFC-227

V.A.Gruzdev, A.V. Baginskii, O.I. Verba, V.N. Genrikh, S.G. Komarov, and S.V. Stankus
Institute of Thermophysics
Siberian Branch Russian Academy of Science
Kutateladze 2
Novosibirsk 630090, Russia

New experimental data on the speed of sound (a), the pressure of saturated vapor (P_S), the vapor density (ρ), the viscosity (μ), the thermal conductivity (λ), the density and the heat capacity (C_P) of liquid refrigerant over a wide range of the thermodynamic parameters are presented as tabulated below. The samples of HFC-227 were 97%, 99.4%, 99.99% pure.

	Method	Range	Error	State
a	UI	273-393 K; 0.004-3 MPa	0.1%	Liquid. Vapor
ρ''	NP	298-384 K; 0.4-3.2 MPa	0.1-0.2%	Vapor
ρ'	PyC	253-333 K. P_S	0.05%	Liquid
μ	CV	253-333 K. P_S	1-2%	Liquid
λ	HW	293-343 K; 1.5-1.8 MPa	1.5-2%	Liquid
C_P	HW	293-343 K; 1.5-1.8 MPa	2-3%	Liquid
P_S	PiC, UI, NP	253-373 K	0.05-0.1%	Vapor

Methods: UI, ultrasonic interferometer; NP, non-unloaded piezometer with pressure null indicator of diaphragm type; PyC, pycnometer with constant volume; CV, capillary viscometer; HW, hot wire; PiC - piezometer with constant volume.

The influence of the sample purity on the speed of sound and the pressure of saturated vapor was studied. For all investigated properties, tables of reference data were prepared. Using experimental data on the speed of sound and the pressure of saturated vapor, the ideal-gas heat capacities and the critical parameters were derived. Enthalpy and entropy of vaporization were calculated from the Clausius-Clapeyron equation. General rules on the thermophysical property variations for the fluorine derivatives of propane are discussed.